DEFORMATION BY COCYCLES OF POINTED HOPF ALGEBRAS OVER NON-ABELIAN GROUPS

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The most efficient method used for classifying finite-dimensional pointed Hopf algebras over the complex numbers is the one introduced by Andruskiewitsch and Schneider. In this method, all Hopf algebras arise as deformations (or liftings) of a Radford-Majid biproduct (or bosonization) $\mathfrak{B}(V)\#\mathbf{k}\Gamma$ of a finite-dimensional braided Hopf algebra, the Nichols algebra $\mathfrak{B}(V)$ of a braided vector space V, and the group algebra $\mathbf{k}\Gamma$ of a finite group Γ.

In almost all known examples, several authors proved by different methods, Hopf-Galois extensions, module categories, cohomology), that these liftings can be obtained by deforming the multiplication in the bosonization $\mathfrak{B}(V)\#\mathbf{k}\Gamma$ by means of a multiplicative 2-cocycle. Nevertheless, only few presented a way to construct explicitly these cocycles, among them a work of L. Grunenfelder and M. Matsnak in the abelian case.

In this talk we will introduce a method to construct multiplicative 2-cocycles for bosonizations of Nichols algebras over Hopf algebras with bijective antipode. Using this construction, we will show that all known finite dimensional pointed Hopf algebras over the dihedral groups $\mathbb{D}_m$ with $m = 4t \geq 12$, over the symmetric group $\mathbb{S}_3$ and some families over $\mathbb{S}_4$ are cocycle deformations of bosonizations of Nichols algebras, by constructing explicitly the 2-cocycles.

This talk is based on a joint work with M. Mastnak.